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Assessment of climate changes on the territory of Georgia revealed by microtemperature variation in boreholes

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Global warming is one of the main hazards facing the whole planet. Investtgations of ice cores have shown that the greenhouse gases concentrations deduced from the preindustrial era to the present. The trend of the future climate which is estimated from the variations in the past at several areas of the Georgia might be of a more general interest. If a difference occurs between the continuation of the reconstructed surface temperature and the recent surface temperature development, a further argument can be provided to estimate amplitude of a global climate warming. The current investigation in elaborating the ground surface temperature history are based on the analysis of temperature-depth profiles, i.e. temperature logs at a given time. During the research will be measured profile which comprises two components: the dominant one result from the steady-state thermal regime of the earth's interior and a further one which is variable in time. The latter component contains the information to the ground surface temperature history, because the variations penetrate into the subsurface by attenuating amplitude and an increasing phase shift. Applying mathematical methods, the transient temperature component is separated and by means of an inversion method, the ground surface temperature history will be reconstructed. More detailed ground surface temperature history will be established for the Georgia as a compilation of the results which are yielded from measurements and from the published geological and meteorological records. A compilation of the temperature records which are published and derived from the proposed measurements provide a first data base of the climate change in Georgia. The frequency analysis of the ground surface temperature history enables to provide a trend of the future climate in the region with clues to a global climate variation.At first time in Georgia will be developed prototypes of a tool which allows recording the long-term transient temperature component of the subsurface thermal regime with very high resolution and reconstruction of climate for the last several centuries from geothermic.
The results will have international importance, becausehitherto no long-term temperature record with such high resolution has not been published from depths greater than 200 m. The determined temporal derivation of the temperature has not been applied in the past. Its time analyses provide an insight of impacts from surface temperature changes as well as of possible fluid migrations.